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ABSTRACT

Designed to improve undergraduate economics instruction, this paper outlines general learning theory and describes two innovative courses in elementary economics. The courses are based on the objectives that economic learning should be generally applicable to different problems which a student will face in the future and that economics concepts be simple and important enough for a student to remember and use independently. Consequently, the contents of most introductory economics courses need to be condensed to contain essential information for a student to know and retain after the course ends. Twenty major economic concepts that are essential for an introductory economics course are listed in order to help teachers reduce content load. Two courses based on these criteria and objectives are described. The second course has been taught recently and incorporates the innovative techniques of programmed instruction, case studies, and macrocomputer simulation games. Student retention of the concepts after completing the course is positive for both courses. (Author/DE)

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WHAT IS A PRINCIPLES COURSE IN ECONOMICS?

by

G.L. Bach
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I am happy to begin by bringing a welcome, from the American Economic Association, to all of you who are participating in this pioneering venture to try to help new Ph.D.s in economics become better teachers of economics. Most of us in the profession spend most of our paid time teaching and preparing to teach. Yet, we pay little attention to this in our typical doctoral programs. The Association's Committee on Economic Education is happy to participate with the Joint Council on Economic Education in sponsoring this attempt to help some of the most promising young Ph.D.s in economics to become better teachers as they go out into their first jobs.

The question in the title I have been given is, of course, an invitation to answer a slightly different question: What <u>should</u> a principles course in economics be? It clearly <u>is</u> our biggest opportunity and our most important teaching assignment. Here is the one big chance we have to get at most of the people who go through colleges and universities if we want to teach them some economics. From two-thirds to three-fourth of all the students we teach take only the elementary course. And most evidence is that we are not doing a particularly good job of teaching the course. Certainly most people think we are not doing as well as we think we are. Casually empirical

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evidence on how much our former students have learned is everywhere around us--in the newspapers, in the current public opinion polls, in the comments of our leaders and the man on the street about economic issues. Ask your neighbor whether he took a course in economics and what he thought of it. He will probably say, if my 20 years of experimentation is any guide, "Yes, I did, and it wasn't very good. I remember it as being terribly dull, when it ought to have been exciting. I certainly wish now I had learned more economics out of it, because I need it every day when I read the newspapers and go about my business." There is a standing, but sad, joke among economists that we have to teach the elementary course over in all of our intermediate and upper-level courses, because the students remember so little from it only a year or two afterwards. On the level of more scientific evidence, Professor Saunders and I in the early 1960s conducted a nationwide study of all social studies teachers in the high schools in the United States and found that 8 years after taking their college economics, there was no statistically significant difference on a national test (the Test of Economic Understanding) between those teachers who had taken an elementary course in economics and those who had never had such a course. Professor Saunders, on a study he is just now completing, reports that he finds slightly more encouraging evidence in another large sample of former college students, but that doesn't change the basic picture that we need to do a lot better job in teaching the elementary economics course.

Objectives

I wish to argue for a particular kind of economics principles course--one whose primary goal is to produce students who can and will think intelligently for themselves about economic issues five and ten years after they have taken the course and have left the campus. I want to put the stress on the student, on helping him to think for himself about economic problems and issues, and on developing his interests and skills so he can and will use economic analysis for himself long after he escapes the final examination. Economics is a way of thinking about problems, not a set of answers, and we ought to accept this fact in our teaching. Moreover, we might as well face it: If we don't get students interested and involved in economics in the elementary course, we have lost them forever. The "five-years-after" or "ten-years-after" test seems to me to be the crucial one as to whether we are doing a good job in teaching elementary economics.

To flesh out this overall goal, let me specify four more specific behavioral goals for the principles course. Note that all of these sub-goals are stated in terms of what we want the student to do, not in terms of what the instructor should say or do. We want the student to:

1. Develop an awareness of, and a continuing interest in, the major economic problems of modern society.

2. Obtain a firm grasp of the few basic principles and analytical concepts a student must have to think intelligently about economic problems for himself. Technical theoretical detail should be sacrificed in order to obtain proficiency in the use of the basic analytical tool kit.

3. Develop an independent ability to apply these analytical tools in thinking independently about economic problems. This involves placing major stress on the process of applying economic concepts and principles in solving (thinking about) economic issues.

4. Learn to use and evaluate both qualitative and quantitative evidence when conflicting points of view are encountered on economic issues.

While these objectives may appear commonplace, they are really quite untraditional in the way they focus specifically on student behavior and student learning, rather than on the detailed economic subject matter of the course per se.

Foundations from Learning Theory

How can we achieve this basic goal of developing students' interests and ability to do their own thinking about economic issues years after they leave the classroom? I argue that we must put our goals in behavioral terms--in terms of what we want the student to do now and later. To make sense of this proposition, we must have a foundation of how people learn--of what the psychologists call learning theory.

Experts on learning agree that we have no satisfactory general theory of human learning. Yet a considerable body of evidence, much of it highly convincing, has been accumulated on what kinds of learning generally occur best under what kinds of circumstances, or, conversely, what conditions are unconducive to learning.

I do not presume to pose as an expert on learning, which I am

not, but I do want to suggest a series of propositions which, from a review of the psychological literature, appear to be generally valid and which can be used as important foundations for course planning, given the general goals I have stated above.

Importance of motivation

Most psychological evidence suggests that the learner's motivation is the most important variable controlling the amount of learning that occurs. People who are highly motivated to learn generally do learn; those who are not motivated seldom do. This has proven true in experiments with rats and with people, and in just about every kind of circumstance one can imagine. It holds true for all ages from small children to adults, though, of course, the motivating factors may be very different at different ages and for different groups. If we accept this proposition, it has sweeping consequences for the way we design our courses and the way we teach. Without effective student motivation, nothing else matters much.

A related proposition is that reward is generally a stronger inducement to learning than is punishment.

Turning, then, to what psychologists call cognitive processes--the intellectual kinds of learning as distinct from attitudinal and motivational issues--it is convenient to look at the facts which appear to govern acquisition of learning, those which govern the retention of learning, and those which govern transfer of learning.

On Acquisition of learning

(1) On the acquisition of learning, prompt, accurate feedback appears to be of critical importance. That is, the learner must get

[illegible] is the central proposition underlying so-called "programmed learning." But it can apply to all kinds of learning processes. The proposition seems to hold firmly with rats in mazes and with children and adults in a wide variety of situations.

(2) Second, acquisition of learning is faster and easier if the learning is meaningful (relevant) to the learner. This, of course, appears closely related to the motivation point above.

(3) Third, effective learning involves active response. The student must do something--whether verbally in class, in out-of-class discussion, or at least mentally. Learning is not a passive process in which the student merely sits and "receives" information from a lecturer.

(4) Fourth, on the degree of guidance conducive to effective acquisition of learning, there appear to be several reasonably well established propositions. They are:

a. The more highly the learner is motivated, the less guidance is required.

b. The more complex the learning situation, the more guidance is generally valuable.

c. More guidance is generally valuable in the early stages of complex learning processes and is decreasingly so in later stages as the student is able to do more of his learning on his own.

d. Excessive guidance, in the form of lecturing or otherwise telling people what to do, tends to violate the principle of feedback, which involves having students do something for themselves and then telling them how they have done in terms of results.

e. Broadly, a case emerges for a mixture, and for a changing mixture, between induction on the part of the student and guidance on the part of the instructor in most learning situations.

On retention of learning

(1) People tend to retain more of what they learn, the more organized, meaningful, and related the material is--in contrast to disorganized, unmeaningful, and unrelated material, such as nonsense syllables. Anything that is rote learned is likely to have a short half life.

(2) The retention rate goes up rapidly as material is "overlearned." That is, learning the same material several times, even though it may appear wasteful at the time, produces more lasting learning in most circumstances. Conversely, the forgetting rate is high on just barely learned materials.

On transfer of learning.

The evidence on transfer is unsatisfactory. There is substantial evidence that transfer occurs more effectively when the process of problemsolving is stressed as a basis for transfer to new situations, in contrast to stressing a particular technique. Stress on fairly simple problemsolving processes does improve people's ability to perform in an orderly way in transferring knowledge from one situation to another. But there is some negative evidence on this point; for example, people who take courses in formal logic or mathematics show no evidence of doing more "logical thinking" in applied situations in the practical world than do those without such formal training.

There is also some evidence that verbalization of principles facilitates transfer, and little counter evidence.

This is by no means a complete list of what the experts know and are discovering more firmly about the learning process in human beings. But it seemed to us to provide a significant psychological foundation for developing a course that would, we hoped, put its major stress on what the student learns, with what the teacher does being secondary to that basic purpose.

Planning the Course

Given our general goal and these propositions about learning, some fundamental things can be said about how to go about planning a principles course.

First, the crucial focus should be on the student and what he does. What his teacher says or does should be governed by the test of how the student is learning.

Second, the economics content of the course should meet one central test: Will it help the student to think for himself about economic issues five years later? This test has two parts: (a) is the learning of general applicability to different problems which the student will face in the future? (b) As a practical matter, is it simple and important enough for him to remember and use independently?

Third, since we know that students learn and retain only a limited amount, in economics and other areas, in any day's work and any class it is essential that we pare down the contents of the course to the real core of what is essential for the students to know and retain. This will mean a painful process for most economists of

giving up a lot of the details that we, as economists, think are intriguing and important. But if the student won't learn them and remember them for the five-year-after test, there is no real point in trying to reach them. The half life of uninteresting and irrelevant niceties of economic theory is about as long as the half-life of the nonsense syllables which psychologists are fond of using in their tests.

Fourth, it is essential that we as teachers know precisely what it is we want the student to learn. Unless we are clear about exactly what this is, it is very unlikely that students will somehow winnow out for themselves what this essential core is.

The Course

There is, of course, no one ideal principles course in economics. Let me suggest, however, a general pattern for one that meets the general criteria I have just laid out.

First, it seems essential to me to list the central economic concepts, or notions, that we want to be sure the students learn--the tool kit of analytical concepts that he should learn and keep to use for himself five years out. I have listed 20 such concepts for the entire course. Perhaps you would prefer to put some of them in the form of principles or simple models; if you prefer it that way, go ahead. The central notions will be clear to economists.

1. Scarcity (limited resources) and need for choice (economizing).
2. Opportunity (alternative) cost--at individual, firm, and national levels.
3. Marginalism.

4. Self-interest (including profits) as a motivating force.
5. Voluntary exchange.
6. Markets and market prices.
7. Supply and demand.
8. Competition.
9. Principle of comparative advantage.
10. Interdependence.
11. "Optimal" allocation of resources--economic efficiency.
12. "Market failures" (market imperfections, income distribution, etc.).
13. Externalities and public goods.
14. Aggregate demand (and main components).
15. Aggregate supply (and potential productive capacity of the system).
16. Real and money income--price level changes.
17. Money and monetary policy.
18. Fiscal policy.
19. Saving and investment.
20. Economic growth.

If the problem is to teach a one-semester or one-quarter course, I would probably give up some of these--for example, #s 11 and 12. These are important ideas, but something probably needs to go if we are to face the five-year-after test in such a short course. Remember that unless something is learned very well, it will probably not last. To teach what is the "optimal" allocation of resources and what are "market failures" in the usual fashion requires a large block of

time that probably cannot be justified in the one-semester or one-quarter course. But you, as an economist, will have your own notions about which of these concepts are most dispenable, if some of them must go.

In terms of course content, I want to describe a course in whose preparation I participated at Carnegie-Mellon University about 10 years ago, since it had precisely the goals I outlined above and since it was developed on the learning theory foundations just outlined. After that I shall report on the effectiveness of this course, and then report similarly on a more recent course developed at Stanford with some modifications on the Carnegie model. I do this because I think the experience may be useful as a concrete example of how these propositions about learning and elementary economics can be combined fruitfully.

The Carnegie Course

In the early 1960s, Carnegie had to develop a new one-semester introductory economics course to replace the previous required one-year course. The students were largely in engineering and science, but with a substantial number of liberal arts majors. The course was required, and was taught primarily in small sections of about 25 students each. Carnegie students are generally bright, ranking high especially in the mathematical, but also in the verbal, sections of the college board tests. But I would not change this course substantially, except to reduce somewhat the volume of reading, for students with lower test scores.

The following course outline is reproduced from the Journal of Economic Education.[1] Note that the main emphasis is on getting students involved, on a small core of economic theory, and on repeated student use (applications) of the theory.

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[1] Journal of Economic Education, Spring 1971, pp. 169-73.

Evaluation of course

How well did the course succeed in achieving the objectives stated? The answer is, apparently very well.

1. Grasp of economic subject matter (basic concepts and their application). By both local Carnegie tests and a national test of economic understanding, students apparently learned about the same amount of economics in the new one-semester course as they had been learning in the previous one-year course. Moreover, their post-course scores on TUCE compared very favorably with those of other institutions with one-year courses, although we did not have good enough controls on student ability to make this comparison entirely satisfactory.

2. Student interest and involvement with economic issues. Using elaborate procedures to protect student anonymity, we obtained a detailed evaluation from each student at the end of the course. First, we asked, "How successful has this course been in stimulating an awareness of, and a continuing interest in, major economic problems of modern society?" The results are given in Table 1.

TABLE 1. Success in Developing Student Interest in Economic Issues (Per Cent Distribution)

			Last Term Grade Average		
	All students*		Below 2.4	2.4-3.2	Above 3.2
Very successful	39	94%	41%	33%	54	98%
Fairly successful	55		49	63	44	
Unsuccessful	6		10	4	2	
	100		100	100	100	

*This table and those which follow are based on about 275 questionnaires.

As the table indicates, 94 percent of all students taking the course rated it as either very successful or fairly successful in achieving this first objective. A still higher proportion, 98 percent, of top quality students with B+ or A averages overall rated the course as either very or fairly successful. Put the other way, only 2 percent of such students considered it unsuccessful in this connection.

We also asked specifically, "Compared with other required courses you have taken at Carnegie, how would you rate this course with respect to how interesting it is?" A summary of results is given in Table 2.

TABLE 2. Interest Compared with Other Freshman-Sophomore Courses

		Student Grade Level		
	All students	Below 2.0	2.0-3.2	Above 3.2
Very high	20%	15%	19%	27%
Above average	37	40	36	37
Average	26	27	27	24
Below average	13	18	14	7
Very low	4	0	4	5
	100	100	100	100

The overall average rating of the course in terms of interest was 3.5 on a 0 to 5 scale. Eighty-three per cent of all students rated the course as average or above in interest. Again, superior students considered the non-technical course more interesting than did average and weak students. In evaluating these ratings, it is important to remember that the course was being compared with basic courses in physics, mathematics, chemistry, and first-year engineering for all the students in engineering and science and with basic English

history, and the like, for students in the liberal arts. Thus, for well over half of the professional engineering and science students, this course in economics outperformed their own basic professional courses, and only 12 percent rated it below them.

Since students may give faborable ratings to courses just to be polite (though this is not a notable characteristic of Carnegie students), we asked a further question on whether they expected to take further courses in economics at Carnegie Tech. Sixty-five per cent of the respondents said they planned to study more economics. More significantly, we actually checked up on how many of these students did in fact go on to study more economics after this course, compared with behavior in earlier years at Carnegie Tech. More advanced economics is entirely elective for these students. Over the preceding few years, an average of about 15 to 18 percent of all engineering and science students had taken advanced elective work in economics. In the year following the introduction of this new course, the figure jumped to nearly 40 percent; so far as we can tell, there were no other new factors that might account for this shift. It is said that actions speak louder than words.

Difficulty of course

Since the course, on the surface, appears to be a very elementary one, with little attention to the more elaborate aspects of economic theory, many economists may suspect that the high ratings reported above reflect student happiness at obtaining an easy A in the course. In fact, the grade distribution was about standard for Carnegie courses.

But more fundamentally, we asked the following question, "Compared with other required courses you have taken, how would you rate this course on how difficult it is?" This question compares the course with other freshman-sophomore courses in physics, mathematics, chemistry, basic engineering, English, and history, a line-up usually considered quite difficult. The results are shown in Table 3.

TABLE 3. Relative Difficulty of Economics Course (Per Cent Distribution

	All students		Last Term Grade Average		
			Below 2.4	Above 3.2	
Very difficult	12	87%	12%	12	49%
Above average	28		24	37	
Average	47		51	37	
Below average	12		12	12	
Easy	1		1	2	
	100		100	100	

As compared with these other required courses, this new course in economics was considered average or above average in difficulty by 87 percent of all Carnegie students. Perhaps even more strikingly, it was considered more difficult than other courses by half of all the top-ability sophomores at Carnegie. This may be especially surprising in view of the apparent low level of the analytical apparatus used in the course. In fact, the bright Carnegie students, who rated very high in mathematical ability, reported that they found the course very difficult because it forced them to think through for themselves unstructured problems and situations, in contrast to the more structured kind of learning that they faced in their professionally-oriented courses. These results suggested strongly to us that independent problemsolving

of even fairly simple unstructured situations is far more difficult than we often assume. Learning economic theory is relatively easy compared with the job of having to apply it for yourself in new situations, even for extremely bright people.

Recent Modifications--the Stanford Course

More recently, substantially the same course has been used by some instructors (though not all) at Stanford in teaching the one-quarter basic principles course offered on an optional basis at Stanford each quarter. The students are a cross-section of Stanford undergraduates, mainly freshmen and sophomores, and drawn from all areas, including pre-professional work and liberal arts. Their ability levels are high. A substantial group of minority students are included.

When my colleague, Professor Lumsden, or I have taught the course, we have used a course similar in goals, content and approach to that in the Carnegie course outlined above, and resting on the same set of learning propositions. The results have apparently been highly satisfactory. Three major changes have, however, been made to modify the Carnegie course.

Programmed learning

Over the past decade, we have learned a great deal about the effectiveness of programmed learning as an efficient means of teaching economics. There is now substantial empirical evidence, including a major national study that demonstrates that programmed learning is a highly efficient device for many students in learning the core of

economic analysis and something about its application.[1] We, therefore, generally offer students the option of learning the analytical core from programmed learning materials or from a regular textbook. The evidence is clear that for some students programmed learning is highly efficient and motivational, while it is anathema to others. We tell students that the national test showed that, on the average, students learned about the same amount of elementary economic theory in 12 hours with programmed learning materials as other students learned in about 7 weeks of a regularly taught course, but that the results varied enormously from student to student. Our experience is that about a quarter to a third of the students use programmed learning, when given the option.

Use of Cases

"Cases" have long been a key teaching instrument in the leading law and business schools. But until very recently they have been used little, if at all, in teaching economics. Stanford experience suggests that they can be a powerful teaching instrument to help students achieve the learning goals outlined above--that is, learning to use core economic concepts independently in thinking through ("solving") economic problems. I have used cases primarily for class discussion. Professor Lumsden assigns two cases a week (a total of 16 for the one-quarter course) for written analysis. The cases are graded and returned promptly, and often are discussed in the small TA

[1] See R. Attiyeh, G.L. Bach, and K. Lumsden, "The Efficiency of Programmed Learning in Teaching Economics," American Economic Review, May 1969.

sessions each Friday.

Cases are real-world situations, in most of which the student is required to reach a decision, or make a judgment as to what ought to be done. The conclusion requires the student to use the concepts just developed in the preceding chapter or section. Each case is thus (a) a lively, stimulating chance for the student to use what he is learning (a powerful motivational device), (b) a prompt experience in using the key concepts just learned, and (c) an experience in economic problem-solving. Cases include very simple applications of one or two central economic concepts. An example is "Cash or Food Stamps for the Poor," following the chapter on consumer behavior; it poses the problem whether we should make grants to the poor in the form of cash or food stamps, and the student is expected to apply the analysis of consumer utility-maximizing behavior to reach his conclusion as to which is the preferable approach. Other cases are more complex--for example, "The Battle of the Supermarkets," which presents the situation of the A&P Grocery Company which, in an oligopolistic industry, in 1972, started a price war to bolster its sagging share of the market. The case presents the facts as A&P confronted them, and then poses the problem of what other competitors in the industry should do. It goes on to pose more general public policy problem raised for consumers and small competitors by price wars in such industries. These two cases are appended to this note to provide concrete examples.[1]

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[1] A more detailed list of such cases can be found in either G.L. Bach, Economics (8th edition, Prentice-Hall, Inc., 1974), or R. Attiyeh, G.L. Bach, and K. Lumsden, Basic Economics (Prentice-Hall, 1973). In each, cases appear at the end of the chapters where they reinforce the concepts which have been developed in that chapter. Another excellent set of cases has been prepared by Professor Rendigs Fels at Vanderbilt and can be obtained by writing to him.

It is important to recognize that cases are not simply discussion ("bull session") pieces, but are specifically designed to make students use for themselves the analytical tools they just learned. The cases thus not only drive home the concept and the way in which it can be applied, but also permit prompt feedback in the student learning process; the student learns immediately whether he is using the right concepts and using them properly in handling the case at the end of the chapter.

For each case we have prepared a "Suggestions for Analysis." This can merely be used by the teacher, be given to the T.A.s for grading papers and for discussing the case in T.A. sessions, or can be given the students for their guidance. The Suggestions for Analysis are just that--not "answers" to the cases, though the amount of guidance is much greater in the earlier than in the later cases. Cases are highly flexigle teaching devices. But however they are used, it is important to recognize that prompt feedback is important. Students need to know whether they are using the right concepts and whether they are using them properly if they are to learn their use effectively.

Macro Computer Game

The Stanford course also uses a macro computer game which is similarly oriented toward getting the students to use for themselves the macroconcepts they have been learning in making economic policy. A brief description of the game, developed jointly over several years by a number of faculty members (especially Profs. Attiyeh, Dunkelberg, and Lumsden), is appended to this note, in the form of the instructions given to players.

Briefly, the game involves putting on a computer a relatively simple macro-model involving some 15 variables, including 3 policy variables (the tax rate, government expenditures, and the money stock). After they have completed the basic analytical and policy readings in the macro section of the course, students are formed into teams of four each and are given the handout appended to this note. It shows 7 years experience of the economy with the relationships in the game. The students are asked to maximize a welfare function, which includes high employment, stable prices, and controlling the share of the GNP that goes to consumption, investment, and government. The team with the highest welfare total over the next 30 years wins, if you want to make it a competitive game.

For the first 10 years, the goal is to maximize a welfare function that puts a lot of stress on avoiding inflation; in the second 10 years, one that puts more stress on avoiding unemployment; and in the third 10 years, one that weights them equally. Potential output in the economy grows, and there is a one-year lag in price behavior after the monetary and fiscal policy steps that affect aggregate demand. Otherwise, there are no policy lags.

The game is Macro 5. The Stanford game comes in 6 versions. The first is extremely simple, involving only investment, consumption, taxes, and government spending; it is designed to illustrate the multiplier with no lags. Macro 2 adds lags to the consumption function. Macro 3 makes private investment a function of interest rates and money, and so on. Given enough time, students might play all the games sequentially. Macro 6 adds an international sector. Some instructors prefer to play one or two of the very simple games before

going on to Macro 5, which is the version described at the end of the note.

Students find the game somewhat confusing if they never have had hands-on experience with computers before, though increasingly students have had such experience. On the other hand, they learn very rapidly and only a few collapse in confusion. Most find the game extremely stimulating and a valuable experience in learning to use the concepts of macroanalysis in policymaking in a bumbling, complex world.[1]

Results of Stanford Course

How effective has the Stanford course been? Apparently very effective. On the basis of anonymous Stanford student ratings, on a 1-7 scale where 7 is the top possible score, it has been rated about 6 each time, with virtually no ratings below 4 (average).

On the TUCE, the Stanford post-course scores have been substantially higher than any reported by other schools in the norming group for the test, even though the Stanford course runs only one-quarter (about 10 weeks).[2]

Students have rated the cases used separately. They come out with high ratings. Over 90% of the students state that they prefer the

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[1]Unfortunately, we suspect that a lot of the value of the game comes from playing it on a real-time basis, where the student gets immediate feedback for the year once he has made his policy decisions. The game could, of course, be played on a batch process basis, but some of the learning effect might well be lost in that case.

[2]Professor Lumsden is preparing for publication a detailed report on the course, which will provide details on student learning and the effects of different variables.

course with cases to the more traditional lecture plus discussion pattern generally used at Stanford, even voting in favor of having written cases assigned weekly--a practice almost unheard of in other comparable basic Stanford courses. Student ratings of individual cases list almost all of them as either highly effective or generally effective in both learning to apply concepts and in stimulating interest ("having fun").

Lastly, student reactions to the macro game have also been strongly positive, though less so than to the cases.

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In conclusion, I want to stress not the particular teaching developments reported above, but the importance of the basic goal stated and of designing a course specifically to achieve that goal, given the learning theory foundations stated. The course outlined, and the teaching devices reported (cases, programmed learning, games, and the like), are powerful instruments for achieving the goals stated. But they will work effectively only if the fundamental goals are kept uppermost in the instructor's mind, and the special teaching devices are seen as only means to achieving those ends.